

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

027566-032

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.51)

09/868849

INTERNATIONAL APPLICATION NO.

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

10046

17 December 1999

22 December 1998

TITLE OF INVENTION

TRANSPORT METHOD FOR THE MOBILE APPLICATION PART (MAP), AND APPARATUS THEREFOR

APPLICANT(S) FOR DO/EO/US

Bill KAVADAS, Leslie GRAF, Mark HOLLIS, Ralph NIESEN and Linda WOO

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
 - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

International Preliminary Examination Report, Unexecuted Declaration

U.S. APPLICATION NO. (if known) 37 CFR 1.53
UNASSIGNED 097/868849INTERNATIONAL APPLICATION NO.
PCT/EP99/10046ATTORNEY'S DOCKET NUMBER
027566-03217. ☒ The following fees are submitted:

CALCULATIONS

PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5)):Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO \$1,000.00 (960)International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO \$860.00 (970)International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 (958)International preliminary examination fee paid to USPTO (37 CFR 1.482)
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 (956)International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 (962)**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$ 860.00

Surcharge of **\$130.00 (154)** for furnishing the oath or declaration later than
months from the earliest claimed priority date (37 CFR 1.492(e)).20 ☐ 30 ☐

\$ -0-

Claims	Number Filed	Number Extra	Rate		
Total Claims	9 - 20 =	-0-	X\$18.00 (966)	\$	-0-
Independent Claims	1 - 3 =	-0-	X\$80.00 (964)	\$	-0-
Multiple dependent claim(s) (if applicable)			+ \$270.00 (968)	\$	-0-

TOTAL OF ABOVE CALCULATIONS =

\$

Reduction for 1/2 for filing by small entity, if applicable (see below).

\$ -0-

SUBTOTAL =

\$ 860.00

Processing fee of **\$130.00 (156)** for furnishing the English translation later than
months from the earliest claimed priority date (37 CFR 1.492(f)).20 ☐ 30 ☐

\$ -0-

TOTAL NATIONAL FEE =

\$ 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by
an appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00 (581)** per property +

\$ -0-

TOTAL FEES ENCLOSED =

\$ 860.00

Amount to be:

\$

charged

\$

- a. ☐ Small entity status is hereby claimed.
- b. ☒ A check in the amount of \$ 860.00 to cover the above fees is enclosed.
- c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Kenneth B. Leffler

NAME

36,075

REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)	
Bill KAVADAS et al.)	Group Art Unit: UNASSIGNED
Application No.: UNASSIGNED)	Examiner: UNASSIGNED
Filed: June 21, 2001)	
For: TRANSPORT METHOD FOR THE MOBILE)	
APPLICATION PART (MAP), AND)	
APPARATUS THEREFOR)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please replace claims 3 and 4 as follows:

3. (Amended) A method according to claim 1, wherein the co-located signalling points of the PLMN coupled by the said packet switched data network include two or more of a Mobile Switching Centre (MSC), a Gateway Mobile Switching Centre (GMSC), a Home Location Register (HLR), and a Visitor Location Register (VLR).

4. (Amended) A method according to claim 1, wherein the packet switched data network is an IP network and the MAP sits on top of the IP layers at each of the co-located signalling points.

REMARKS

The above changes to the claims have been made to delete multiple dependency of the claims, to round out the scope of patent protection being sought, and generally to place the claims in better condition for examination on the merits.

Respectfully submitted,

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By:



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Date: June 21, 2001

Attachment to Amendment dated June 21, 2001

Marked-up claims 3 and 4

3. (Amended) A method according to claim 1 [or 2], wherein the co-located signalling points of the PLMN coupled by the said packet switched data network include two or more of a Mobile Switching Centre (MSC), a Gateway Mobile Switching Centre (GMSC), a Home Location Register (HLR), and a Visitor Location Register (VLR).

4. (Amended) A method according to claim 1 [any one of the preceding claims], wherein the packet switched data network is an IP network and the MAP sits on top of the IP layers at each of the co-located signalling points.

TRANSPORT METHOD FOR THE MOBILE APPLICATION PART (MAP), AND APPARATUS THEREFORField of the Invention

- 5 The present invention relates to a Mobile Application Part transport mechanism for use in a Public Land Mobile Network.

Background to the Invention

- 10 In existing Public Land Mobile Networks (PLMN), signalling information, e.g. relating to call set-up procedures, management, and teardown, is generally carried between signalling points by a Signalling System No.7 (SS7) based transport mechanism. SS7 is a widely used transport protocol involving multiple protocol layers.
- 15 Information is exchanged between Mobile Switching Centres (MSCs), Home Location Registers (HLRs), and Visitor Location Registers (VLRs) using messages defined by the standardised Mobile Application Part (MAP) protocol, messages which are carried by the SS7 transport mechanism. More particularly, the SS7 layers involved in the transport of the MAP messages are:
- 20 a Message Transport Part (MTP) which handles *inter alia* message separation, error detection and correction, as well as an interface to the physical data link;
- a Signalling Connection and Control Part (SCCP) which is responsible for controlling signalling connections in the SS7 network as well as for routing between signalling points; and
- 25 a Transaction Capabilities Application Part (TCAP) which facilitates the use of advanced Intelligent Network (IN) services by providing for the exchange of information between signalling points using a connectionless service of the SCCP.

30 The complexity of the conventional transport mechanism will be readily apparent, but such complexity is required in order to ensure the correct routing and error free transmission of signalling data between the numerous signalling points of a PLMN.

Summary of the Present Invention

- 35 It has been recognised by the inventors of the present invention that the complex SS7 transport mechanism is not necessary for transporting MAP messages between signalling points of a PLMN which are co-located, i.e. which are located in close proximity to one another. Thus, it is possible to employ a "lightweight" transport mechanism which

reduces or eliminates the coding and decoding requirements inherent in the SS7 transport mechanism.

According to a first aspect of the present invention there is provided a method of transmitting signalling information between two signalling points of a Public Land Mobile Network, which signalling points are co-located, the method comprising;

formulating said signalling information into messages according to the Mobile Application Part (MAP) protocol; and

transmitting the messages between the two signalling points using a packet switched data network.

As the signalling points to which the method of the present invention is applied are co-located, it is possible to couple the two signalling points using a direct connection.

Embodiments of the present invention remove the requirement for processing signalling information using TCAP and SCCP when the information is to be transmitted between co-located signalling points.

Preferably, the above method is used in a network after a signalling point wishing to send a MAP message has determined whether or not the message is destined for a co-located signalling point. In the event that the destination signalling point is not co-located, then a network other than said packet switched data network may be used to transport the message. One such alternative network is an SS7 network.

Preferably, the co-located signalling points of a PLMN coupled by the said packet switched data network include two or more of a Mobile Switching Centre (MSC), a Gateway Mobile Switching Centre (GMSC), a Home Location Register (HLR), and a Visitor Location Register (VLR). The signalling points may also include one or more Intelligent Network (IN) nodes.

Preferably, the packet switched data network is an IP network, where the MAP sits on top of the IP layers (including an IP protocol layer, and a TCP and/or UDP layer) at each of the co-located signalling points. Where the co-located signalling points have access to an SS7 network, the MAP at the signalling points may also sit on top of the SS7 protocol layers. More preferably, an adaptation layer is provided between the MAP and the IP and SS7 layers, the adaptation layer responding to a MAP dialogue initiation by determining whether or not the destination address (e.g. Global Title) for the dialogue corresponds to or is associated with a co-located signalling point. If the destination address (e.g. Global

Title) for the dialogue does correspond to a co-located signalling point, then the adaptation layer determines the IP address corresponding to the destination address.

According to a second aspect of the present invention there is provided apparatus for transmitting signalling information between two signalling points of a Public Land Mobile Network, which signalling points are co-located, the apparatus comprising;

first signal processing means for formulating said signalling information into messages according to the Mobile Application Part (MAP) protocol;

second signal processing means for formulating MAP messages according to a packet switched data transport mechanism; and

transmission means for transmitting the formulated packet switched messages between the two signalling points over a packet switched network.

According to a third aspect of the present invention there is provided a signalling point within a Public Land Mobile Network (PLMN), the signalling point comprising:

first signal processing means for formulating said signalling information into messages according to the Mobile Application Part (MAP) protocol;

second signal processing means for formulating MAP messages according to a packet switched data transport mechanism; and

transmission means for transmitting the formulated packet switched messages to a second co-located signalling point over a packet switched network.

The signalling point may also act as a signalling transfer point for messages received from non-co-located signalling points, whereby the signalling transfer point relays MAP messages to a co-located signalling point over the packet switched network.

Preferably, the signalling point comprises means for determining whether or not a destination signalling point for a MAP message is co-located and, if so, for passing the MAP messages to said second signal processing means and, if not, for passing the MAP messages to an SS7 transport mechanism to provide for transmission of the messages over an SS7 network.

Brief Description of the Drawings

For a better understanding of the present invention and in order to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 illustrates schematically a part of a Public Land Mobile Network;

Figure 2 illustrates the transport mechanism protocol stack implemented at certain signalling points of the PLMN of Figure 1; and

Figure 3 is a flow diagram illustrating a method of transmitting Mobile Application Part messages between signalling points of the PLMN of Figure 1.

Detailed Description of Certain Embodiments

In Figure 1 there is illustrated schematically a Public Land Mobile Network (PLMN) comprising two Gateway Mobile Switching Centres (GMSCs) 1,2 which provide the interface between the PLMN and a Public Switched Telephone Network (PSTN) 3. The GMSCs 1,2 "represent" the PLMN from the view point of the PSTN 3 and signalling communications therebetween are carried using the ISDN User Part (ISUP) protocol. The GMSCs may also provide the interfaces between the PLMN and other networks although this is not shown in Figure 1.

Within the PLMN, it is necessary to communicate signalling information between signalling points of the network for the purpose of call set-up, management, and teardown. Figure 1 illustrates a number of signalling points within the PLMN including: the GMSCs 1,2; Mobile Switching centres (MSCs) 4,5 which are responsible for routing calls within the PLMN; Visitor Location Registers (VLRs) 6,7 which maintain a record of the subscribers registered with associated MSCs at any given time; and Home Location Registers (HLRs) 8,9 which maintain a permanent record of the PLMN subscribers together with a dynamic record of the location of those subscribers at any given time. These signalling points are in close proximity to one another, i.e. they are "co-located". In some circumstances the co-located signalling points may be located in the same room.

Signalling information is conveyed between the various signalling points of the PLMN using the Mobile Application Part (MAP) interface protocol. Conventionally, MAP messages are transported using the SS7 transport mechanism. This mechanism will not be described in detail here (reference should be made for example to "Understanding Telecommunications", Vols 1 & 2, Studentlitteratur, Lund, Sweden, ISBN 91-44-00214-9), although Figure 1 does illustrate the provision of an SS7 network in which SS7 signalling links (illustrated by broken lines) may be routed via a Signalling Transfer Point (STP) 10. The SS7 transport mechanism is also used to convey ISUP signalling messages between the GMSCs 1,2 and the PSTN 3.

In Figure 1, the solid lines indicate Ethernet connections between signalling points. These Ethernet connections are used to carry IP datagrams encapsulating MAP messages,

providing an alternative to the SS7 transport mechanism described in the preceding paragraph. It is noted that only direct ethernet connections (point-to-point) are provided between signalling points, i.e. there is no requirement for routers in the IP network.

5 Figure 2 shows the protocol which is implemented at each of the PLMN signalling points. The MAP 11 sits on top of a so-called "adaptation layer" 12 which in turn sits on top of two distinct protocol stacks. A first of these stacks 13 provides the conventional SS7 transport mechanism, whilst the second 14 provides for the IP transport mechanism. As far as the MAP 11 is concerned, the adaptation layer 12 behaves identically to the TCAP
10 so that no modifications to the MAP 11 are required.

Initialisation of a MAP dialogue commences with a dialogue request message being passed from the MAP 11 to the adaptation layer 12. The adaptation layer uses a user reference contained in the dialogue request message to determine the associated Sub-System Number (SSN). If the SSN does not indicate that the user is a HLR, VLR, or
15 MSC, the dialogue is designated for SS7 and the normal SS7 procedures utilised (i.e. protocol stack 13).

If, on the other hand, the SSN does indicate that the user is a HLR, VLR, or MSC, the
20 called address, i.e. Global Title (GT), is checked by the adaptation layer 12. Each of the MSC/VLRs, GMSCs, and HLRs which are co-located with the originating signalling point is associated with a Global Title series. These series are pre-recorded in an address table, accessible to the adaptation layer 12. The address table contains a mapping between Global Title series and IP addresses. If the check determines that the called Global Title is
25 not a member of one of the recorded Global Title series, the dialogue is again transported over SS7. However, if the check confirms that the called Global Title is a member of a recorded Global Title series, then, providing that the TCP/IP link towards that address is active, a request granted message returned to the MAP 11 by the adaptation layer. In the event that the identified link is not active, then the dialogue is once again transported over
30 SS7. Subsequent messages relating to the same dialogue are transported over IP or SS7 depending upon the initial checks performed by the adaptation layer.

To limit the processor load required for checking an address called by a MAP dialogue request message, the number of addresses contained in the address table is restricted to a
35 relatively small number, i.e. the number of co-located signalling points which can make use of the lightweight IP transport mechanism is restricted. A suitable number of signalling points may be six or less.

Figure 3 is a flow diagram illustrating the processing steps carried out at a signalling point following initiation of a MAP dialogue. Typically, these steps are carried out by a suitably programmed computer, or by one or more Digital Signal Processors (DSPs), although other suitable implementations will be readily apparent.

5 It will be appreciated by the person of skill in the art that various modifications may be made to the above described embodiment without departing from the scope of the present invention. For example, rather than using the TCP routing protocol above the IP protocol, a simpler routing protocol may be used, e.g. Point to Point Protocol (PPP). In a further
10 modification, the invention may be employed to relay MAP messages received at a signalling transfer point from an originating signalling point, not co-located with the receiving signalling point, to a destination signalling point which is co-located with the signalling transfer point. In this case, the signalling transfer point will check whether or not the destination address of the received MAP messages is contained within the address
15 table already described and, if so, determine the associated IP address.

09/868849

7A 531 Rec'd PCT/7

21 JUN 2001

Claims

1. A method of transmitting signalling information between two signalling points of a Public Land Mobile Network, the method comprising;

formulating said signalling information into a message according to the Mobile Application Part (MAP) protocol; and

determining whether or not a destination signalling point for the MAP message is co-located and, if so, passing the MAP message to a packet switched data network to provide for transmission of the message over said packet switched data network and, if not, passing the MAP message to a Signalling System No. 7 (SS7) transport mechanism to provide for transmission of the message over an SS7 network.

2. A method according to claim 1, wherein said determining is performed at a signalling point wishing to send a Mobile Application Part (MAP) message.

3. A method according to claim 1 or 2, wherein the co-located signalling points of the PLMN coupled by the said packet switched data network include two or more of a Mobile Switching Centre (MSC), a Gateway Mobile Switching Centre (GMSC), a Home Location Register (HLR), and a Visitor Location Register (VLR).

4. A method according to any one of the preceding claims, wherein the packet switched data network is an IP network and the MAP sits on top of the IP layers at each of the co-located signalling points.

5. A method according to claim 4, wherein the co-located signalling points have access to an SS7 network and the MAP

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at the signalling points sits on top of the SS7 protocol layers.

6. A method according to claim 5, wherein an adaptation layer is provided between the MAP and the IP and SS7 layers, the adaptation layer responding to a MAP dialogue initiation by determining whether or not the destination address for the dialogue corresponds to a co-located signalling point and, if the destination address for the dialogue does correspond to a co-located signalling point, then the adaptation layer determines the IP address corresponding to the destination address.

7. Apparatus for transmitting signalling information between two signalling points of a Public Land Mobile Network, the apparatus comprising;

first signal processing means for formulating said signalling information into a message according to the Mobile Application Part (MAP) protocol;

second signal processing means for formulating MAP messages according to a packet switched data transport mechanism; and

means for determining whether or not a destination signalling point for the MAP message is co-located and, if so, for passing the MAP message to said second signal processing means to provide for transmission of the message over a packet switched data network and, if not, for passing the MAP message to a Signalling System No. 7 (SS7) transport mechanism to provide for transmission of the message over an SS7 network.

8. A signalling point within a Public Land Mobile Network (PLMN), the signalling point comprising:

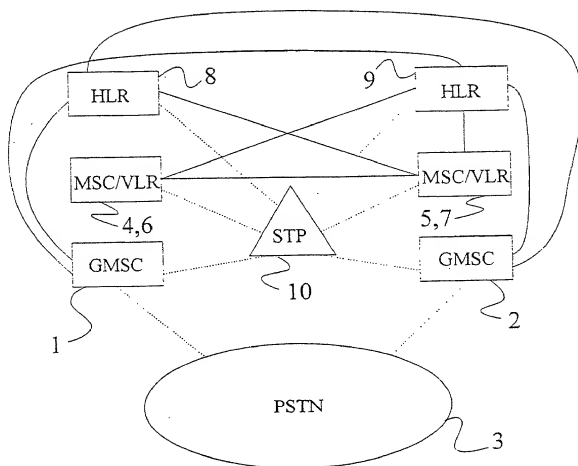
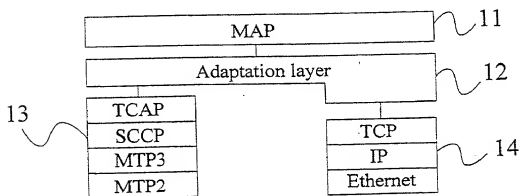
first signal processing means for formulating said signalling information into a message according to the Mobile Application Part (MAP) protocol;

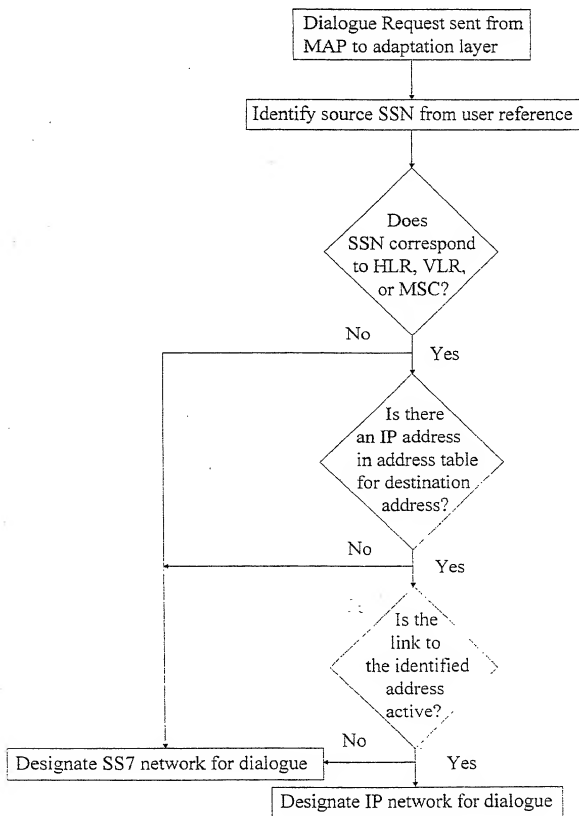
9A

second signal processing means for formulating MAP messages according to a packet switched data transport mechanism; and

means for determining whether or not a destination signalling point for the MAP message is co-located and, if so, for passing the MAP message to said second signal processing means to provide for transmission of the message over a packet switched data network and, if not, for passing the MAP message to a Signalling System No. 7 (SS7) transport mechanism to provide for transmission of the message over an SS7 network.

9. A signalling point according to claim 8, wherein the signalling point acts as a signalling transfer point for messages received from non-co-located signalling points, whereby the signalling transfer point relays MAP messages to a co-located signalling point over the packet switched network.

Figure 1Figure 2

Figure 3

207 98094
8k 25 PC-45

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to Provisional and PCT International Applications)

Attorney's Docket No.

027566-032

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TRANSPORT METHOD FOR THE MOBILE APPLICATION PART (MAP), AND APPARATUS THEREFOR

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Number _____

on _____

and was amended

on _____ (if applicable).

☒ was filed as PCT international application

Number PCT/EP99/10046

on 17 December 1999

and was amended

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(e) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119
FINLAND	982776	22 December 1998	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D)
(Includes Reference to Provisional and PCT International Applications)

Attorney's Docket No.

027566-032

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

(Application Number)

(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States applications(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations §1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. §120:

U.S. APPLICATIONS

STATUS (check one)

U.S. APPLICATION NUMBER

U.S. FILING DATE

PATENTED

PENDING

ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.

PCT FILING DATE

U.S. APPLICATION NUMBERS
ASSIGNED (if any)

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D)
(Includes Reference to Provisional and PCT International Applications)

Attorney's Docket No.

027566-032

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention;

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Alan E. Kopecki	25,813	B. Jefferson Boggs, Jr.	32,344	Fred W. Hathaway	32,236
Regis E. Slutter	26,999	William H. Benz	25,952	Wendi L. Weinstein	34,456
Samuel C. Miller, III	27,360	Peter K. Skiff	31,917	Mary Ann Dillahunty	34,576
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James A. LaBarre	28,632	Michael G. Savage	32,596		
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R. Danny Huntington	27,903	Charles F. Wieland III	33,096		



21839

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21839

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Ronald L. Grudziecki

at (703) 836-6620.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE OR FIRST INVENTOR		SIGNATURE	DATE
Bill KAVADAS		<i>[Signature]</i>	10/09/2001
RESIDENCE		CITIZENSHIP	
Victoria, AUSTRALIA		Australian	
POST OFFICE ADDRESS			
3063 <i>[Signature]</i>			
454 Queens Pde, Fitzroy North, Melbourne, Victoria 3403, AUSTRALIA			
FULL NAME OF SECOND JOINT INVENTOR, IF ANY		SIGNATURE	DATE
Leslie GRAF		<i>[Signature]</i>	24/8/01
RESIDENCE		CITIZENSHIP	
Victoria, AUSTRALIA		Australian	
POST OFFICE ADDRESS			
3 Hendercourt, Ballwyn, Melbourne, Victoria 3103, AUSTRALIA			
FULL NAME OF THIRD JOINT INVENTOR, IF ANY		SIGNATURE	DATE
Mark HOLLIS		<i>[Signature]</i>	23/8/2001
RESIDENCE		CITIZENSHIP	
Victoria, AUSTRALIA		Australian	
POST OFFICE ADDRESS			
1 Daintree Avenue, Park Orchads, Victoria, AUSTRALIA			

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D)
(Includes Reference to Provisional and PCT International Applications)

Attorney's Docket No.

027566-032

<p>4-011 FULL NAME OF FOURTH JOINT INVENTOR, IF ANY Ralph NIESEN</p>		<p>SIGNATURE <i>Ralph Niesen</i></p>	<p>DATE 27/8/01</p>
<p>RESIDENCE North Fitzroy, AUSTRALIA <i>Box</i></p>		<p>CITIZENSHIP Australia</p>	
<p>POST OFFICE ADDRESS 30 Mark Street, North Fitzroy 3068, AUSTRALIA</p>			
<p>5-011 FULL NAME OF FIFTH JOINT INVENTOR, IF ANY Linda WOO</p>		<p>SIGNATURE <i>Linda Woo</i></p>	<p>DATE 28/08/2001</p>
<p>RESIDENCE Victoria, AUSTRALIA <i>Box</i></p>		<p>CITIZENSHIP Australia</p>	
<p>POST OFFICE ADDRESS 3 Wilpena Place, Vermont South, Victoria 3133, AUSTRALIA</p>			
<p>FULL NAME OF SIXTH JOINT INVENTOR, IF ANY</p>		<p>SIGNATURE</p>	<p>DATE</p>
<p>RESIDENCE</p>		<p>CITIZENSHIP</p>	
<p>POST OFFICE ADDRESS</p>			
<p>FULL NAME OF SEVENTH JOINT INVENTOR, IF ANY</p>		<p>SIGNATURE</p>	<p>DATE</p>
<p>RESIDENCE</p>		<p>CITIZENSHIP</p>	
<p>POST OFFICE ADDRESS</p>			
<p>FULL NAME OF EIGHTH JOINT INVENTOR, IF ANY</p>		<p>SIGNATURE</p>	<p>DATE</p>
<p>RESIDENCE</p>		<p>CITIZENSHIP</p>	
<p>POST OFFICE ADDRESS</p>			
<p>FULL NAME OF NINTH JOINT INVENTOR, IF ANY</p>		<p>SIGNATURE</p>	<p>DATE</p>
<p>RESIDENCE</p>		<p>CITIZENSHIP</p>	
<p>POST OFFICE ADDRESS</p>			
<p>FULL NAME OF TENTH JOINT INVENTOR, IF ANY</p>		<p>SIGNATURE</p>	<p>DATE</p>
<p>RESIDENCE</p>		<p>CITIZENSHIP</p>	
<p>POST OFFICE ADDRESS</p>			